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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Reimers	§	Atty. Dkt. No.: COS-954
Serial No.: 10/632,213	§	Group Art Unit: 1764
Confirmation No.: 1114	§	Cust. No.: 25264
Filed: July 31, 2003	§	Examiner: Manoharan
For: Heat Exchanger and Process for Devolatilizing Polymer Using the Same	§	

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
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37 CFR 1.10
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TRANSMITTAL LETTER AND FEE AUTHORIZATION

In connection with the above identified application, Applicants respectfully submit the following documents:

1. Appeal Brief.

The Commissioner is authorized to charge the fee of $500.00, along with any additional fees that may be required for this submission, or credit any overpayments, to Deposit Account No. 03-3345.

Respectfully submitted,

Lenora Evans

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APPEAL BRIEF

Appellants submit this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 1764 dated February 23, 2007, finally rejecting claims 1, 3-10, 12-16 and 21.

Real Party in Interest

The present application has been assigned to Fina Technology Inc., P.O. Box 674412, Houston, Texas 77267.

Related Appeals and Interferences

Appellants assert that no other appeals, interferences or judicial proceedings are known to the Appellants, the Appellants' legal representative or Assignee that will

directly affect, be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 1, 3-10, 12-16 and 21 are pending in the application. Claims 1, 3-10, 12-16 and 21 stand rejected under 35 U.S.C. §103(a). Claims 7-8 stand rejected under 35 U.S.C. §112, second paragraph. The rejection of the pending claims is appealed. The pending claims are shown in the attached Appendix A.

Status of Amendments

No amendments have been made to the pending claims in response to the Final Office Action.

Summary of Claimed Subject Matter

Independent claim 1 recites a process comprising passing a polymer through a devolatilizer comprising a plate heat exchanger, wherein the plates of the plate heat exchanger are heated by a plurality of heating tubes and wherein each of the heating tubes comprises a return tube nested inside of a supply tube. *See*, specification at least page 4, lines 10-14 (paragraph 8). The process further includes introducing a heat transfer fluid into the supply tube, passing the heat transfer fluid from the supply tube to the return tube and withdrawing the heat transfer fluid from the return tube. *See*, *Id.*

Grounds of Rejection to be Reviewed on Appeal

1. The rejection of claims 1, 3-10, 12-16 and 21 under 35 U.S.C. §103(a) as being unpatentable over *Fujitaka* or *Aneja* in view of *Duran* and/or *Williams*.

2. The rejection of claims 7-8 under 35 U.S.C. §112, second paragraph.

Arguments

I. THE EXAMINER ERRED IN REJECTING CLAIMS 1, 3-10, 12-16 AND 21 UNDER 35 U.S.C. §103(a).

Claims 1, 3-10, 12-16 and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,353,088 (*Fujitaka*) or U.S. Patent No. 4,808,262 (*Aneja*) in view of U.S. Patent No. 4,834,172 (*Duran*) and/or U.S. Patent No. 5,632,797 (*Williams*).

Fujitaka teaches a multi-stage devolatilization process wherein a foaming agent is added to a polymer solution during transfer from a first devolitilizer (known to one skilled in the art) to a second devolitilizer, wherein the second devolitilizer is pressure controlled. *See*, column 2, lines 40-55 and column 3, lines 50-67. *Fujitaka* further teaches that where a heating unit is required, the heat exchanger preferably includes vertical multitubular type rather than a plate type. *See*, column 4, lines 39-47.

Aneja teaches devolatilizing high viscosity polymer solutions by heating the solutions along a short zone of indirect heat exchange in order to avoid polymer degradation. *See*, abstract and column 1, lines 53-65.

The First Office Action states that the process of *Fujitaka* or *Aneja* differs from the claimed invention in that they do not teach heating tubes comprising a return tube nested inside of a supply tube. *See*, page 5, first paragraph. The First Office Action further states that to substitute the nested tubes of *Duran* for the heat exchanger serving as heater of *Fujitaka* or *Aneja* to arrive at the claimed invention would have been obvious to one of ordinary skill in the art. *See*, *Id.* "To establish a prima facie case of obviousness . . . there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *See*, MPEP §2142.

Appellants disagree with the statement that it would be obvious to incorporate the heating apparatus of *Duran* into the heating mechanisms of *Fujitaka* or *Aneja*. There is no motivation in either *Duran* or the primary references, such as a suggestion to use such heating apparatus for the devolatilization of polymers, nor a teaching as to how to incorporate the heating apparatus of *Duran* into the heating mechanisms of *Fujitaka* or *Aneja*. The Examiner uses the preference to utilize vertical multitubular type heat

exchangers in *Fujitaka* as a motivation to combine *Fujitaka* with *Duran* ("which appears corresponding to the type suggested in *Duran*"). *See*, Final Office Action at page 3, third paragraph. The pending claims recite a plate heat exchanger, not a multi-tubular heat exchanger.

Therefore, Appellants further submit that even if the heating apparatus of *Duran* was incorporated into the heating mechanisms of *Fujitaka* or *Aneja*, one would still not arrive at the claimed invention. *Duran* teaches passing one heat transfer fluid through specified conduits and another (*e.g.*, different) heat transfer fluid through nested conduits. *See*, column 6, lines 5-25. The heating apparatus of *Duran* does not teach, show or suggest introducing a heat transfer fluid into the supply tube (within a plate heat exchanger), passing the heat transfer fluid (*e.g.*, the same fluid) from the supply tube to the return tube and withdrawing the heat transfer fluid from the return tube, as recited in the pending claims. The Final Office Action acknowledges that "*Duran* does not specifically teach passing the same heat transfer fluid from the supply tube to the return tube". *See*, page 3, last paragraph.

However, the Final Office Action then states that "the above argued process is not an unobvious subject matter, nor is it indicative of criticality in the art, as taught by *Williams*". *See*, Final Office Action at page 4, first paragraph. Appellants disagree. As taught by the specification, prior art plate heat exchangers have not utilized nested tubes. See, specification at paragraph 15.

The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. *See*, *In re Gordon*, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

Appellants submit that *Williams* has no relevance to the pending claims or cited art and does not supply a feature missing from the primary references. *Williams* teaches a vaporizer for halide-free, silicon-containing liquid reactants used in producing preforms. *See*, Abstract. Heat is added to the liquid reactant (silicon-containing liquid) by means of a hot oil heat transfer system. The heat transfer system has an oil supply and an oil return. *See*, column 5, lines 27-32. There is no motivation in either *Williams* or the primary references, such as a suggestion to use such heating apparatus for the

devolatilization of polymers, nor a teaching as to how to incorporate the heating apparatus of *Willaims* into the heating mechanisms of *Fujitaka* or *Aneja*.

However, Appellants further submit that even if the heating apparatus of *Williams* was incorporated into the heating mechanisms of *Fujitaka* or *Aneja*, one would still not arrive at the claimed invention. The hot oil heat transfer system of Williams is connected to the preheater by conventional supply lines and fittings. *See*, column 5, lines 30-32. There is no teaching or suggestion in *Williams* to introduce a heat transfer fluid into a supply tube (within a plate heat exchanger), passing the heat transfer fluid (*e.g.*, the same fluid) from the supply tube to the return tube and withdrawing the heat transfer fluid from the return tube, as recited in the pending claims. In fact, Williams teaches the opposite. In particular, Williams teaches passing the liquid reactant through a single, straight through channel in the preheater for contact with the heat transfer fluid. *See*, column 5, lines 45-52. Therefore, Appellants respectfully request reversal of the rejection.

II. THE EXAMINER ERRED IN REJECTING CLAIMS 7-8 UNDER 35 U.S.C. §112, SECOND PARAGRAPH.

Claims 7-8 stand rejected under 35 U.S.C. §112, second paragraph. The Final Office Action states that the claimed impact resistanct polystyrene in claim 8 lacks antecedent support. *See*, Final Office Action at page 2, first paragraph. Appellants submit that claim 7, from which claim 8 depends, recites polystyrene which broadly includes impact resistant polystyrene. Therefore, Appellants respectfully request reversal of the rejection.

Conclusion

In conclusion, the references of record, either alone or in combination, nowhere teach, show or suggest the features of the pending claims. Thus, Appellants respectfully request reversal of the rejections of claims 1, 3-10, 12-16 and 21.

Respectfully submitted,

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Appendix A

Pending Claims

1. A process comprising:

passing a polymer through a devolatilizer comprising a plate heat exchanger, wherein the plates of the plate heat exchanger are heated by a plurality of heating tubes and wherein each of the heating tubes comprises a return tube nested inside of a supply tube;

introducing a heat transfer fluid into the supply tube;

passing the heat transfer fluid from the supply tube to the return tube; and

withdrawing the heat transfer fluid from the return tube.

3. The process of Claim 1, wherein there is a pressure differential between the supply tube and the return tube such that the heat transfer fluid flows from the supply tube and into the return tube.

4. The process of Claim 1 wherein the polymer comprises from about 40 to about 5 percent volatiles prior to being devolatilized.

5. The process of Claim 1 wherein the polymer comprises from about 10,000 to 100 ppm volatiles after being devolatilized.

6. The process of Claim 1 wherein the polymer is selected from the group consisting of thermoplastic polymers, silicone polymers, elastomers, lubricants, and mixtures thereof.

7. The process of Claim 6 wherein the polymer is a thermoplastic polymer selected from the group consisting of polystyrene, polyphenylene ethers, polycarbonates, polyvinyl chloride, polyurethanes, polyetherimides, polyamides, polyesters, polyacrylates and polymethacrylates, linear polyethylene and their copolymers, styrene methyl-methacrylate, styrene maleic-anhydride, styrene-acrylonitrile rubber and styrene-methyl-methacrylate-rubber and mixtures thereof.

8. The process of Claim 7 wherein the polymer is impact-resistant polystyrene.

9. The process of Claim 6 wherein the polymer is an elastomer selected from the group consisting of polybutadiene, polyisoprene, butylene rubbers, polyisobutylene, ethylene-propylene rubbers, and ethylene-propylene-diene (EPDM) rubbers; homopolymers of vinyl ethers, cyclic esters, methacrylic esters, acrylonitrile, and mixtures thereof.

10. The process of Claim1 further comprising forming the the plate heat exchanger from a metal selected from the group consisting of carbon steel, stainless steel, aluminum, and combinations thereof.

12. The process of Claim 1 wherein each plate of the plate heat exchanger is in contact with no more than one heating tube.

13. The process of Claim 1 wherein at least some of the plates of the plate heat exchanger are in contact with at least two heating tubes.

14. The process of Claim 1 wherein the heat transfer fluid is selected from the group consisting of air, nitrogen, water, oil, glycols, and mixtures thereof.

15. The process of Claim 14 wherein the heat transfer fluid is water in the form of steam.

16. The process of Claim 14 wherein the heat transfer fluid is oil.

21. The process of claim 1, wherein the heat transfer fluid passing through the supply tube has a temperature that is greater than a temperature of the heat transfer fluid passing through the return tube.

Appendix B

Evidence

1. MPEP §2142.
2. *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984).

Appendix C

Related Proceedings

Not Applicable